

\*309IHSSF230\*



DocumentID NONCD0002799

Site Name WRIGHTSVILLE AVE

DocumentType SITE ASSESSMENT RPT (SAR)

RptSegment 1

DocDate 5/29/2009

DocRcvd 7/2/2009

Box SF230

AccessLevel Public

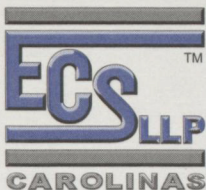
Division Waste Management

Section Superfund

Program IHS (IHS)

DocCat Facility



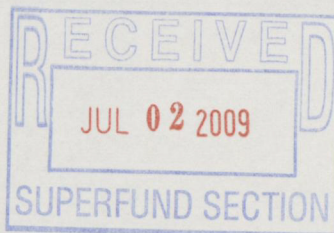


## ECS CAROLINAS, LLP

"Setting the Standard for Service"

Geotechnical • Construction Materials • Environmental • Facilities

May 29, 2009



REC-LEAD

Mr. Stephen Pike  
Investors Trust Mutual  
121 North Columbia Street  
Chapel Hill, North Carolina 27514

Reference: Phase I Remedial Investigation Report  
2501, 2503, 2505, 2507 and 2509 Wrightsville Avenue  
Wilmington, New Hanover County, North Carolina  
Site ID# NONCD0002799  
ECS Project 22-13842B

Dear Mr. Pike:

ECS Carolinas, LLP (ECS) is pleased to provide this Phase I Remedial Investigation Report for the above referenced site. Included in this Remedial Investigation Report is a description of the field activities and procedures performed, as outlined in the Remedial Investigation Work Plan. As required, this document has been certified by the Responsible Party and Registered Site Manager. These certificates are provided in the cover of the document and as Appendix A.

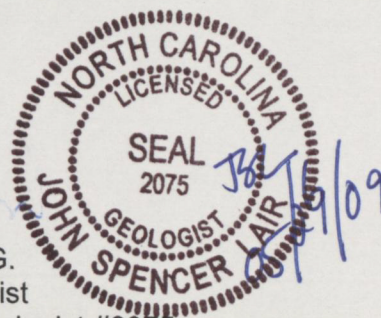
ECS appreciates this opportunity to provide our services to you on this project. If you have any questions concerning this report or this project, please contact us at (910) 686-9114.

Sincerely,

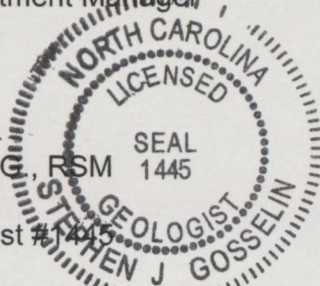
ECS CAROLINAS, LLP

Amy C. Conchas, REM  
Environmental Department Manager

John S. Lair, P.G.  
Principal Geologist  
NC Licensed Geologist #2075



Stephen Gosselin, P.G., RSM  
Principal Geologist  
NC Licensed Geologist #1445



cc: Mr. Kim Caulk – NCDENR, REC Program

## Table of Contents

A. Statement of Purpose.....	1
B. Site History.....	1
C. Method of Investigation .....	2
1) Investigation Narrative.....	2
2) Soil Boring Installation and Soil Sample Collection.....	2
3) Install Groundwater Monitoring Wells and Groundwater Sample Collection ..	3
4) Quality Assurance/ Quality Control.....	4
5) Dispose of Investigation-Derived Wastes (IDW) .....	4
D. Site Geology and Hydrogeology.....	4
E. Investigation Results .....	5
F. Conclusion and Recommendations .....	6

### FIGURES

- Figure 1 – Topographic Map
- Figure 2 – Site Map
- Figure 3 – Sample Location Map
- Figure 4 – Potentiometric Surface Map

### TABLES

- Table 1 – Summary of Soil Sample Results
- Table 2 – Summary of Groundwater Sample Results

### APPENDICES

- Appendix A – Soil Boring Logs
- Appendix B – Temporary Monitoring Well Construction Diagrams
- Appendix C – Laboratory Results
- Appendix D – Field Notes
- Appendix E – Certification of Documents



## C. Method of Investigation

### 1) Investigation Narrative

ECS proposed seven soil boring locations on the property to attempt to locate the general area of impact to the site soils and groundwater. The proposed sample locations, identified as S-1 through S-7 were previously surveyed onto a site plan and the coordinates of the boring locations were identified using a GPS. The sample location map is included as Figure 3. Soil boring S-2 was located within the former building foot print and soil boring S-7 was located in a vegetative and what appeared to be undisturbed portion of the site to act as a background soil sample. Prior to soil boring activities, ECS contacted a public utility locator to identify underground utilities on the site. The boring locations were located in an area free of underground utilities.

On March 24, 2009, ECS personnel were met on-site by Mr. Walt Davis, with Subsurface Environmental Investigations, LLC (SEI), North Carolina well contractor certification 3162. The weather was approximately 50 to 55° Fahrenheit and sunny. The site investigation was conducted using a track-mounted Geoprobe® and a hand auger

### 2) Soil Boring Installation and Soil Sample Collection

Soil borings S-1 through S-6 were installed using a Geoprobe®. Due to access limitations from vegetation, soil boring S-7 was installed using a hand auger. The down-hole equipment was decontaminated prior to conducting each boring using a steam cleaner and an alquinox solution. Soil borings S-1 through S-6 were advanced to a depth of 10 feet bgs. Soil boring S-7 was advanced to a depth of eight feet BGS. Soil samples were collected continuously from the ground surface to the termination depth of each boring. The soil samples were removed from the plastic sleeve of the geoprobe rod and placed directly in a new plastic gallon-size bag, in one foot increments. The soil samples were classified in the field and screened for relative levels of volatile organic vapors using a Flame Ionization Detector (FID). The soil sample from each boring collected above the static water table exhibiting the highest reading on the FID or located directly below the aforementioned ash layer was containerized for laboratory analysis. Based on the field observations and FID readings, one soil sample from each boring was collected from the plastic bag indicating the greatest potential for contamination. One duplicate soil sample was collected from sample S-5 for quality control/assurance purposes.

The soil samples were placed in laboratory prepared containers using a new pair of disposable nitrile gloves for each sample. Each container was labeled with the project name, sample location, presence or absence of preservative, and the date and time the samples were collected. The sample containers were placed in a cooler containing ice to maintain the samples at approximately 4° Celsius. The samples were shipped via overnight express delivery to Environmental Conservation Laboratories, Inc. (ENCO) a State of North Carolina-certified laboratory in Cary, North Carolina for chemical analysis. A Chain of Custody Record was maintained and included with the analytical data. The soil samples were shipped to and analyzed for VOCs using EPA Method 8260, SVOCs using EPA Method 8270 plus 10 tentatively identified contaminants (TICs) and 13 Priority Pollutant (PP) Metals using EPA Method 6010.



Following soil sampling activities, the annular space of borings S-1, S-3, S-4 and S-7 was backfilled to the ground surface with hydrated bentonite pellets. Excess soil cuttings were placed on and wrapped with plastic and left by the borehole pending sample analysis results. Based on the analytical results, which are discussed below in Section E – Investigation Results, laboratory analysis did not identify concentrations of chemicals of concern (COC) in the soils samples; except S-2 which exceeded either the Protection of Groundwater Soil Remediation Goals or the Health Based Soil Remediation Goals. Therefore, the soil cuttings from the soil borings, except S-2 were placed back on-site. Soil cuttings from soil boring S-2 were wrapped in poly and placed within the 55-gallon drum pending disposal as non-hazardous soils.

### 3) Install Groundwater Monitoring Wells and Groundwater Sample Collection

Upon completion of soil sampling activities, SEI advanced soil borings S-2, S-5 and S-6 to a depth approximately 20 feet BGS, which is approximately 10 feet below the static groundwater table. The borings were advanced using direct push technology. The soil cuttings were placed in plastic bags and/or wrapped in plastic and placed beside the borehole. Soils cuttings collected from borings not exhibiting soil contamination were spread on-site. Soil cuttings collected from borings exhibiting soil contamination (S-2) were placed in a 55-gallon drum pending proper disposal. SEI installed a 1-inch diameter Schedule 40 PVC temporary monitoring well in each boring. The temporary wells were installed with approximately 10 feet of slotted PVC screen (0.01-inch slot widths) positioned to intersect the observed water table in TW-S-5 and 11.03 feet bgs in TW-S-6.

Immediately following the installation of the temporary groundwater wells, the temporary wells were developed and purged. The temporary wells were purged by evacuating at least three well volumes using a peristaltic pump and a new length of dedicated tubing at each well location. After well purging, each well was allowed to recover at least 50 percent of its volume prior to sample collection. The groundwater samples were placed in laboratory prepared containers using a new pair of disposable nitrile gloves for each sample. Each container was labeled with the project name, sample location, presence or absence of preservative, and the date and time the samples were collected. The sample containers were placed in a cooler containing ice to maintain the samples at approximately 4° Celsius. The samples were shipped using Fed Ex to ENCO in Cary, North Carolina for chemical analysis for VOCs using EPA Method 8260, SVOCs EPA Method 8270 plus TICs and the 13 PP Metals using EPA method 6010. A Chain of Custody Record was maintained and included with the analytical data.

Immediately after collection, the groundwater samples were dispensed into sample containers provided by the laboratory and placed on ice. Immediately following sample collection, pH, specific conductivity and temperature were measured in the wells using a HANNA meter. The readings are as followed:

Field Measurement	TW-S-2	TW-S-5	TW-S-6
pH (SU)	6.20	6.35	6.26
Specific Conductivity (mS/cm)	0.31	0.55	0.26
Temperature (°C)	19.5	17.4	17.2

SU = Standard Unit    mS/cm = milliSiemen/centimeter    °C = °Celsius



After sampling, the top of casing of the temporary wells were surveyed by ECS employees to determine the approximate groundwater flow direction, which is towards the north-northwest. This information is shown on Figure 4, potentiometric surface map. The wells were then removed and the borings backfilled to the ground surface with hydrated bentonite pellets by SEI, a State of North Carolina Certified Well Contractor.

#### **4) Quality Assurance/ Quality Control**

Quality assurance and quality control (QA/QC) measures were followed according to Appendix A of the REC Program Implementation Guidance. One duplicate soil sample and one duplicate groundwater sample were collected as part of the Phase I Remedial Investigation. The duplicate samples were analyzed for VOCs using EPA Method 8260, SVOCs using EPA Method 8270 plus TICs and the 13 PP Metals using EPA method 6010.

#### **5) Disposal of Investigation-Derived Wastes (IDW)**

ECS containerized the IDW on-site pending laboratory analysis. Developed and purged groundwater was placed in NCDOT 55-gallon steel drums for disposal. The soil cuttings were placed in plastic bags and/or wrapped in plastic and placed beside the borehole. Based on the analytical results, which are discussed below in Section E – Investigation Results, ECS did not identify chemicals of concern (COC) in the groundwater samples; therefore, the collected liquid IDW can be placed back on-site. The soil cuttings from the soil borings, except S-2 can be placed back on-site. Soil cuttings from soil boring S-2 were wrapped in poly and placed within the 55-gallon drum pending disposal as non-hazardous soils.

### **D. Site Geology and Hydrogeology**

As determined from the USGS Topographic Map, Wilmington, North Carolina Quadrangle (Figure 1), the site lies at an approximate elevation of 31 feet above mean sea level. The site is relatively flat and as such, surface water runoff from the site vicinity is difficult to determine. The area surrounding the site slopes to the west-southwest towards an unnamed tributary of Burnt Mill Creek. The unnamed tributary is located approximately 1,500 feet west of the site and a drainage to the tributary is located approximately 500 feet southwest of the site. However, a dry drainage ditch is located on the northern portion of the site. The drainage ditch is likely to flow to the north towards Burnt Mill Creek which is located approximately 1,650 feet north of the site.

The site is located in the Coastal Plain Physiographic Province. The Coastal Plain is composed of seven terraces, each representing a former level of the Atlantic Ocean. Soils in this area generally consist of sedimentary materials transported from other areas by the ocean or rivers. These deposits vary in thickness from a thin veneer along the western edge of the region to more than 2,000 feet near the coast. The sedimentary deposits of the Coastal Plain rest upon consolidated rocks similar to those underlying the Piedmont and the Blue Ridge Physiographic Provinces.

The United States Department of Agriculture Soil Conservation Service identifies the site soils as Seagate fine sand (Se), Baymeade fine sand, 1 to 6 percent slopes (Be) and Leon fine sand (Le). Seagate fine sand is located on the majority of the site. This soil type is located on nearly level, broad flats and uplands. This soil type is somewhat poorly drained and has a seasonal high water table at 1.5 to 2.5 feet below ground surface. Baymeade fine sand is located on the west-northwestern quarter of



the site. This soil type is located on flats and low ridges on uplands. This soil type is well drained and has a seasonal high water table at depth of more than four feet. Leon fine sand is located on the northern portion of the site. This soil type is found on nearly levels rims on depressions, on smooth flats, on uplands and stream terraces. This soil type is poorly drained and has a seasonal high water table at or near the surface.

Soil borings at the site identified the site soils as a black and brown sand transitioning to a red and grey sand at an approximate depth of six feet bgs. Groundwater was encountered at an approximate depth of nine feet bgs. Three temporary monitoring wells were installed on-site in boring locations chosen to identify potential groundwater contamination and to determine the groundwater flow direction. The top of casing elevation of the temporary monitoring wells were surveyed by ECS personnel and a depth to water from the top of casing was measured using a Solinst water meter. Using the top of casing measurements and the depth to water measurements, the groundwater elevation for the temporary wells were calculated, as illustrated in the following table.

Monitoring Well	Top of Casing Elevation	Depth to Water (ft)	Groundwater Elevation
TW-S-2	101.83	9.17	92.66
TW-S-5	100.63	9.54	91.09
TW-S-6	102.33	11.03	91.30

Based on the groundwater elevation calculations, the groundwater flow at the site is towards the north-northwest.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Community and Panel number 3720312700J, dated April 3, 2006, the site is located in Zone X, which are areas determined to be outside the 0.2% annual chance flood.

Research of sources of potable water at the site and within 0.5 miles of the site was conducted by ECS. According to Mr. Tige Brubaker with the City of Wilmington Engineering Department, potable water for the City of Wilmington is obtained from the Cape Fear River in Bladen County, North Carolina. Potable water for New Hanover County is obtained from three water supply wells, which are located in Castle Hayne, Monterey Heights, and Flemington, which are located greater than five miles from the site. A walking and vehicular reconnaissance performed by ECS of the properties within 0.5 miles of the site did not identify water supply wells.

## E. Investigation Results

Laboratory analysis of the soil samples did not identify VOCs or metals at concentrations exceeding either the Protection of Groundwater Soil Remediation Goals or the Health Based Soil Remediation Goals. Polyaromatic hydrocarbons (PAHs) were identified in soil samples S-1 through S-4, which were located on the southern portion of the site, near the location of the former on-site buildings. These soil samples were collected from depths of four to six feet bgs. Benzo[a]pyrene and benzo[b]flouranthene were detected in soil sample S-2 at concentrations exceeding the Protection of Groundwater Soil Remediation Goals and/or the Health Based Soil Remediation Goals.

Laboratory analysis of groundwater samples did not identify VOCs above the laboratory detection limit. Bis(2-ethylhexyl)phthalate was identified in sample TW-S-5 at a concentration of 1.9 ug/l, which is below the NCAC 2L groundwater standard of 2.5 ug/l. No other SVOCs were identified in



the three groundwater samples. Arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium and zinc were identified in the groundwater samples. The chromium and lead concentrations in samples TW-S-2 and TW-S-6 exceeded the NCAC 2L groundwater standard.

## **F. Conclusion and Recommendations**

Based on the results of the soil sampling, the site soils appear to be impacted with PAHs in the location of the former building. The presence of PAHs in the location of the former building could be a result of the fire and ash from the original building in the early 1950s. ECS recommends continued remedial investigation, as required by the REC Program, to define the horizontal and vertical extent of the PAH impacted soil. The continued remedial investigation should include additional soil samples on the southern portion of the site at multiple depths to define the horizontal and vertical extent of the PAH impacted soil.

Arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium and zinc were identified in the groundwater samples. The chromium and lead concentrations in samples TW-S-2 and TW-S-6 exceeded the NCAC 2L groundwater standard. Since these metals were not identified in the soil samples from their respective borings above the protection of groundwater soil remediation goals, these concentrations are most likely due to sediment in the groundwater. ECS recommends re-sampling the groundwater in the locations of TW-S-2 and TW-S-6 using low flow techniques in order to reduce turbidity and minimize the amount of sediment collected in the groundwater sample.



FIGURES





Approximate Scale 1 inch = 1,100 feet.

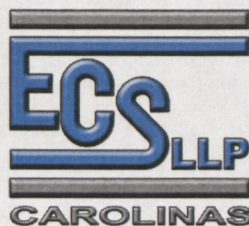
Contour Interval = 5 feet

## FIGURE 1: TOPOGRAPHIC MAP

Source: USGS, Wilmington, North Carolina Quadrangle 1979.



Remedial Investigation Work Plan  
2501, 2503, 2507 and 2509  
Wrightsville Ave.  
Wilmington, North Carolina



ECS Project No. 22-13842B  
May 2009





Not To Scale

## FIGURE 2: SITE MAP

Source: New Hanover County on-line GIS, 2006 Aerial Photograph



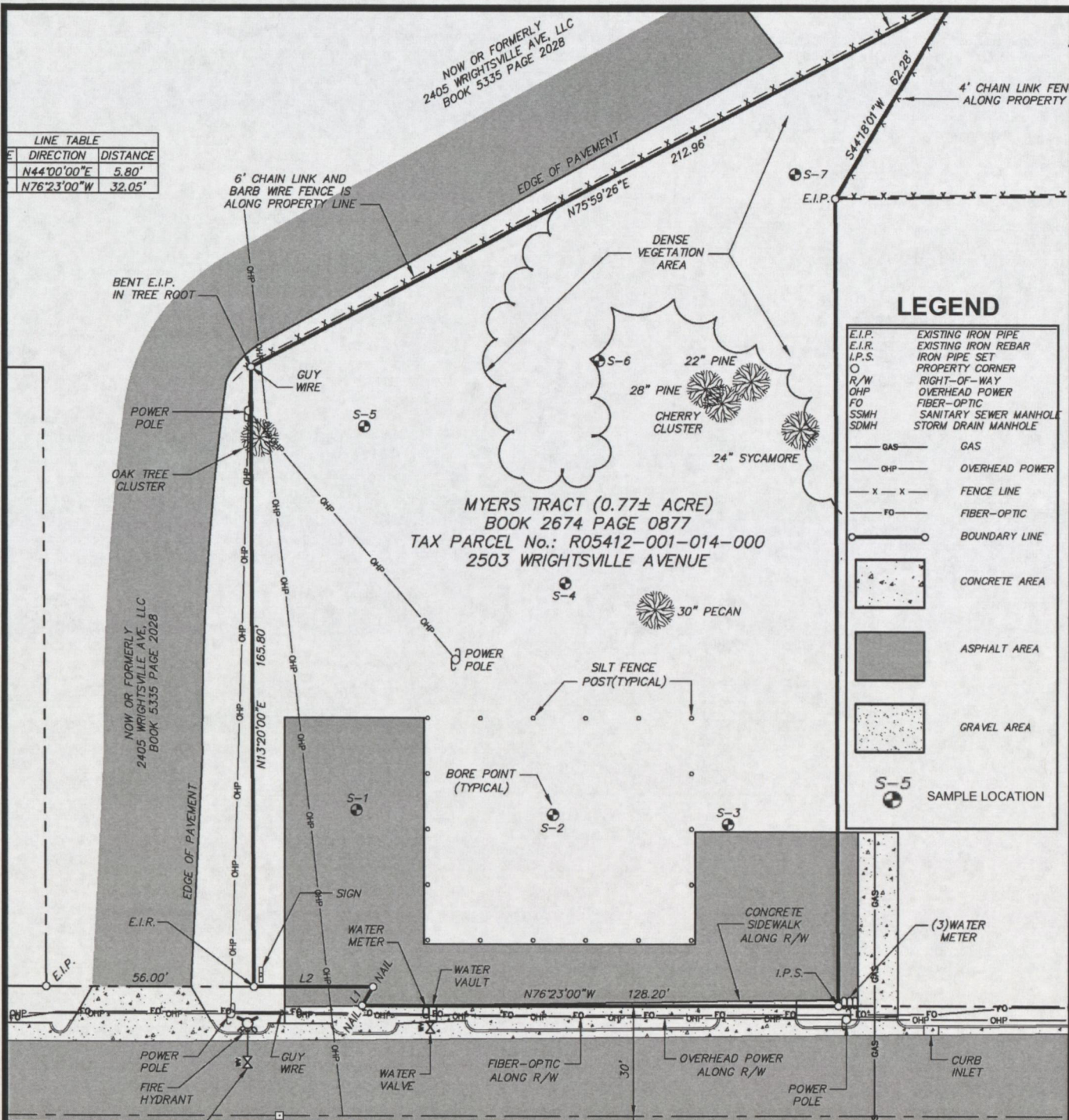
Remedial Investigation Work Plan  
2501, 2503, 2507 and 2509  
Wrightsville Ave.  
Wilmington, North Carolina



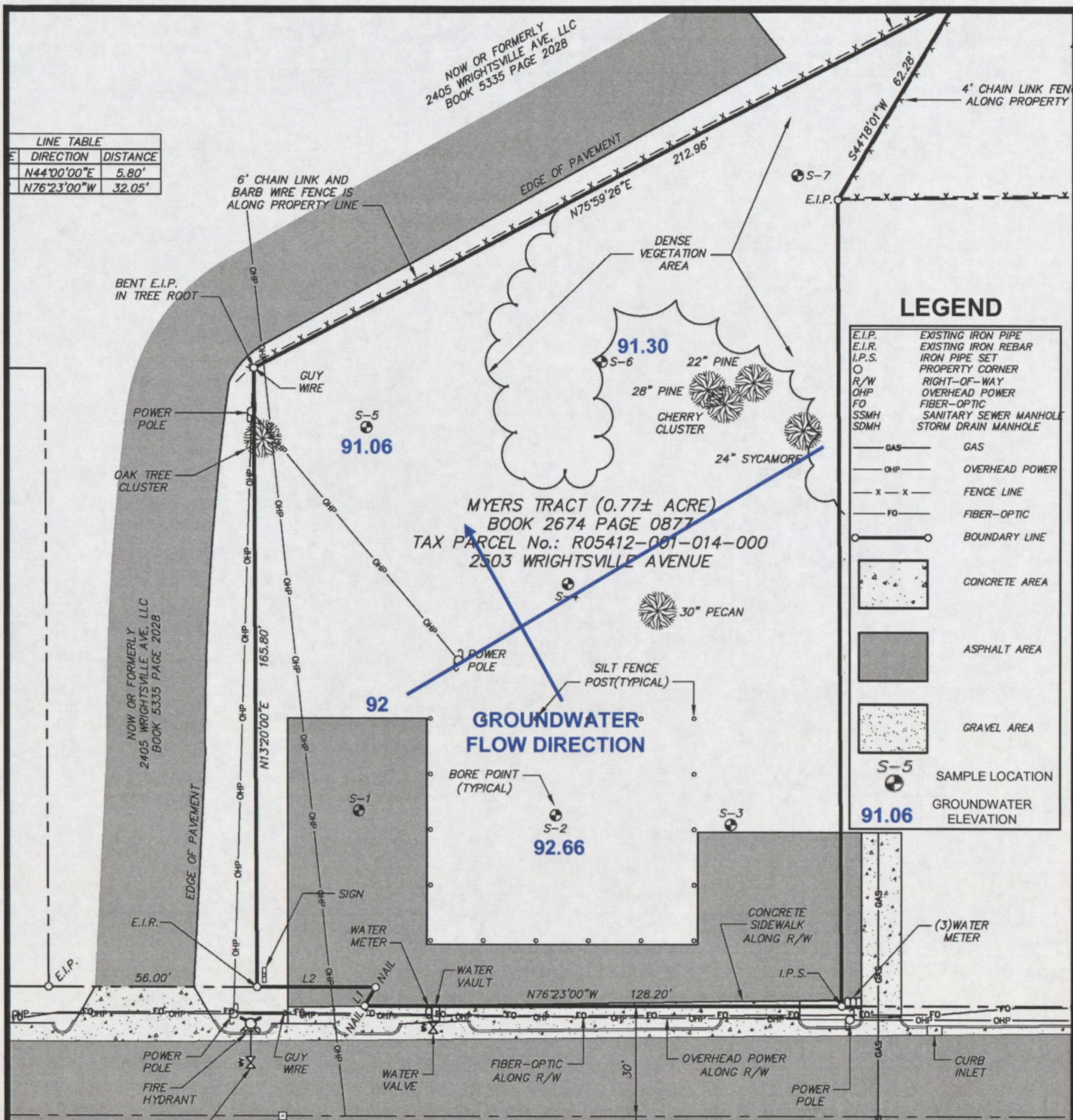
ECS Project No. 22-13842B  
May 2009



LINE TABLE		
E	DIRECTION	DISTANCE
N44°00'00"E		5.80'
N76°23'00"W		32.05'







Approximate Scale

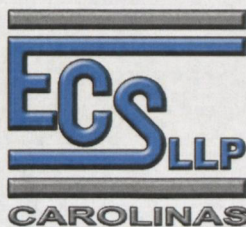
1 inch = 40 feet

## FIGURE 4: POTENTIOMETRIC SURFACE MAP

Source: Site Survey, January 2008



Remedial Investigation Work Plan  
2501, 2503, 2507 and 2509  
Wrightsville Ave.  
Wilmington, North Carolina



ECS Project No. 22-13842B  
May 2009

TABLES



**Table 1**  
**Summary of Soil Results**  
**2501, 2503, 2505, 2507 and 2509 Wrightsville Avenue**  
**Wilmington, New Hanover County, North Carolina**  
**Site ID# NONCD0002799**  
**ECS Project Number 22-13842B**

	S-1	S-1	S-2	S-3	S-4	S-5	Duplicate	S-6	S-7	Protection of Groundwater Soil Remediation Goals	Health Based Soil Remediation Goals
Grab / Composite	Composite	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab		
Depth	Composite	4ft.	4ft.	4 ft.	6ft.	10ft	10ft.	9ft.	3ft.		
Date	3/14/08	3/24/09	3/24/09	3/24/09	3/24/09	3/24/09	3/24/09	3/24/09	3/24/09		
<b>EPA Method 8260B</b>											
Acetone	<0.0541	0.0065	<0.0012	0.0049	0.023	<0.0012	<0.0012	<0.0013	<0.0014	2.81	12000
<b>EPA Method 8270C</b>											
Benzo[a]anthracene	0.355	<0.036	0.093	<0.040	<0.036	<0.039	<0.039	<0.037	<0.038	0.343	0.15
Benzo[a]pyrene	0.402	<0.036	0.14	<0.040	<0.036	<0.039	<0.039	<0.037	<0.038	0.0928	0.015
Benzo[b]fluoranthene	0.620	<0.043	0.22	<0.047	0.064	<0.046	<0.046	<0.043	<0.045	1.18	0.15
Benzo[g,h,i]perylene	<0.335	<0.037	0.11	<0.041	0.040	<0.040	<0.040	<0.038	<0.039	6720	No Standard
Benzo[k]fluoranthene	<0.335	<0.045	0.076	<0.050	<0.045	<0.048	<0.048	<0.046	<0.047	11.8	1.5
Chrysene	0.425	<0.037	0.14	<0.041	0.040	<0.040	<0.040	<0.038	<0.039	38.2	15
Fluoranthene	0.693	0.045	0.23	<0.040	0.049	<0.039	<0.039	<0.037	<0.038	276	460
Indeno[1,2,3-cd]pyrene	<0.335	<0.037	0.10	<0.041	<0.038	<0.040	<0.040	<0.038	<0.039	3.32	0.15
Phenanthrene	<0.335	<0.036	0.055	<0.040	<0.036	<0.039	<0.039	<0.037	<0.038	59.6	No Standard
Pyrene	0.693	0.037	0.20	<0.040	0.040	<0.039	<0.039	<0.037	<0.038	286	340
<b>EPA Method 6010B</b>											
Arsenic	NA	0.30	3.01	<0.29	0.42	<0.28	<0.28	0.29	1.84	26.2	4.4
Barium	NA	6.90	61.3	1.45	6.09	3.64	1.99	3.04	13.1	848	3,000
Cadmium	NA	0.042	0.404	<0.008	0.112	<0.008	<0.008	<0.007	0.008	0.95	14
Chromium	NA	2.97	6.46	1.05	7.55	3.07	1.89	3.83	11.4	27.2	24,000
Lead	NA	7.76	53.3	1.61	11.2	2.55	1.67	2.56	5.08	270	400
Selenium	NA	<0.31	1.19	0.40	0.99	<0.33	<0.33	<0.38	2.38	12.2	78
Silver	NA	<0.06	<0.06	<0.07	<0.06	<0.06	<0.06	<0.06	<0.06	0.217	78
<b>EPA Method 7471A</b>											
Mercury	NA	<0.005	0.05	<0.006	0.01	<0.006	<0.006	<0.006	0.04	0.015	4.60

NA= Not Analyzed

Concentrations in mg/kg

MSCC = Maximum Soil Contaminant Concentration

\* Inactive Hazardous Site Branch Protection of Groundwater Soil Remediation Goals



Table 2

Summary of Groundwater Sample Results  
 2501, 2503, 2505, 2507 and 2509 Wrightsville Avenue  
 Wilmington, New Hanover County, North Carolina  
 Site ID# NONCD0002799  
 ECS Project Number 22-13842B

Compound	EPA Analytical Method	TW-S-2	TW-S-5	Duplicate	TW-S-6	Trip Blank	NCAC 2L Standard
Volatiles	8260B	BDL	BDL	BDL	BDL	BDL	NA
Bis(2-ethylhexyl)phthalate	8270C	<1.9	1.9	<1.9	<1.9	Not Analyzed	2.5
Arsenic	6010B	22.5	15.5	13.3	33.9	Not Analyzed	50
Beryllium	6010B	1.08	0.33	0.38	1.34	Not Analyzed	No Standard
Cadmium	6010B	0.20	<0.09	<0.09	0.09	Not Analyzed	1.75
Chromium	6010B	110	18.6	20.1	112	Not Analyzed	50.0
Copper	6010B	15.4	2.65	3.65	11.0	Not Analyzed	1,000
Lead	6010B	50.8	9.1	11.4	57.0	Not Analyzed	15
Mercury	7470A	0.16	<0.11	<0.11	0.14	Not Analyzed	1.05
Nickel	6010B	26.7	4.4	4.6	28.1	Not Analyzed	100
Selenium	6010B	<3.4	14.8	19.5	<3.4	Not Analyzed	50
Silver	6010B	<1.0	<1.0	<1.0	<1.0	Not Analyzed	17.5
Thallium	6010B	0.194	0.044	0.038	0.230	Not Analyzed	No Standard
Zinc	6010B	68.0	28.8	16.5	54.3	Not Analyzed	1,050

Samples collected on March 24, 2009  
 BDL = Below Detection Limit  
 NA= Not Applicable  
 Concentrations in ug/l